IN THE CLAIMS

1. (Original) In a method of computerized processing of chest images, the improvement comprising:

obtaining a digital first image of a chest;

producing a second image which is a mirror image of the first image;

performing image warping on one of the first and second images to produce a warped image which is registered to the other of said first and second images; and

subtracting the warped image from the other image to generate a subtraction image.

2. (Original) The method of Claim 1, further comprising:

displaying the subtraction image.

3. (Original) The method of Claim 1, wherein said step of obtaining a digital first image comprises:

obtaining a digital original image; and

performing lateral inclination correction on the original image to generate said first image, comprising,

detecting ribcage edges on both sides of the lungs in the original image,

determining average horizontal locations of the left and right ribcage edges at plural vertical locations,

fitting the determined average horizontal locations to a straight line to derive a midline, rotating the original image so that the midline is vertical, and

shifting the rotated image to produce said first image with the midline centered in said first image.

4. (Original) The method of Claim 3, wherein said step of performing image warping comprises:

performing global matching to align the lung areas of the one image to the other image;

performing local matching of selected regions of interest in the right and left lungs of said one image to the right and left lungs of the other image to generate shift values for pixels of said one image;

performing surface fitting on the shift values of the right lung of the one image and independently performing surface fitting of shift values of the left lung of the one image to smooth the shift values and generate fitted shift values for the left and right lungs of the one image;

shifting pixels of the one image using the fitted shift values.

5. (Original) The method of Claim 1, further comprising:

producing an enhanced subtraction image, including: enhancing contrast of the lung regions of the subtraction image;

adding a predetermined pixel value to the pixel values of the lung regions of the subtraction image;

maintaining pixels of regions other than the lung regions of the subtraction image at one of,

(1) a constant pixel value to generate a uniform background, and

(2) at the values of corresponding pixels in one of the first and second images; and

displaying the enhanced subtraction image.

6. (Original) The method of Claim 4, further comprising: producing an enhanced subtraction image, including:

enhancing contrast of the lung regions of the subtraction image;

adding a predetermined pixel value to the pixel values of the lung regions of the subtraction image;

maintaining pixels of regions other than the lung regions of the subtraction image at one of,

(1) a constant pixel value to generate a uniform background, and

(2) at the values of corresponding pixels in one of the first and second images; and displaying the enhanced subtraction image.

7. (Original) The method of Claim 4, wherein the step of performing image warping comprises:

reducing by a predetermined factor the matrix size of the first and second images prior to performing global matching;

scaling fitted shift values by the predetermined factor for application of the scaled fitted shift values to pixels of said one image;

shifting pixels of said one image using the scaled fitted shift values; displaying the subtraction image.

8. (Original) The method of Claim 6, wherein the step of performing image warping comprises:

reducing by a predetermined factor the matrix size of the first and second images prior to performing global matching;

scaling fitted shift values by the predetermined factor for application of the scaled

fitted shift values to pixels of said one image;

shifting pixels of said one image using the scaled fitted shift values;

displaying the subtraction image.

9. (Original) The method of Claim 1, further comprising:

locating locations of candidate abnormalities in the subtraction image;

extracting at least one predetermined feature from each candidate abnormality;

comparing each extracted feature with a predetermined threshold; and

removing from consideration false positive locations having an extracted feature

which bears a predetermined relationship with respect to said predetermined threshold.

10. (Original) The method of Claim 9, wherein said extracting step comprises:

extracting at least one of contrast, standard deviation, and correlation between

contrast and standard deviation at the locations of the candidate abnormalities in the

subtraction image.

11. (Original) The method of Claim 10, wherein contrast and standard deviation are

extracted.

12. (Original) The method of Claim 10, wherein contrast and correlation are

extracted.

13. (Original) The method of Claim 10, wherein standard deviation and correlation

are extracted.

14. (Original) The method of Claim 11, wherein correlation is extracted.

15. (Original) The method of Claim 14, comprising:

displaying at least one of said first, second and subtraction images with locations of candidate abnormalities under consideration identified in the displayed image.

16. (Original) The method of Claim 3, further comprising:

locating locations of candidate abnormalities in the subtraction image;

extracting at least one predetermined feature from each candidate abnormality;

comparing each extracted feature with a predetermined threshold; and

removing from consideration false positive locations having an extracted feature which bears a predetermined relationship with respect to said predetermined threshold.

17. (Original) The method of Claim 16, wherein said extracting step comprises:

extracting at least one of contrast, standard deviation, and correlation between contrast and standard deviation at the locations of the candidate abnormalities in the subtraction image.

18. (Original) The method of Claim 17, wherein contrast and standard deviation are extracted.

19. (Original) The method of Claim 17, wherein contrast and correlation are extracted.

20. (Original) The method of Claim 17, wherein standard deviation and correlation are extracted.

21. (Original) The method of Claim 18, wherein correlation is extracted.

22. (Original) The method of Claim 21, comprising:

displaying at least one of said original, first, second and subtraction images with locations of candidate abnormalities under consideration identified in the displayed image.

23. (Original) The method of Claim 6, further comprising:

locating locations of candidate abnormalities in the subtraction image;

extracting at least one predetermined feature from each candidate abnormality;

comparing each extracted feature with a predetermined threshold; and

removing from consideration false positive locations having an extracted feature which bears a predetermined relationship with respect to said predetermined threshold.

24. (Original) The method of Claim 23, wherein said extracting step comprises:

extracting at least one of contrast, standard deviation, and correlation between contrast and standard deviation at the locations of the candidate abnormalities in the subtraction image.

25. (Original) The method of Claim 24, wherein contrast and standard deviation are extracted.

26. (Original) The method of Claim 24, wherein contrast and correlation are extracted.

27. (Original) The method of Claim 24, wherein standard deviation and correlation are extracted.

28. (Original) The method of Claim 25, wherein correlation is extracted.

29. (Original) The method of Claim 28, comprising:

displaying at least one of said original, first, second and subtraction images with locations of candidate abnormalities under consideration identified in the displayed image.

30. (Original) In a method for computerized processing of at least one chest image, the improvement comprising:

obtaining a digital first image of a chest of a subject;

detecting ribcage edges on both sides of the lungs in said first chest image;

determining average horizontal locations of the left and right ribcage edges at plural vertical locations;

fitting the determined average horizontal locations to a straight line to derive a midline; rotating the chest image so that the midline is vertical; and

shifting the rotated image to produce a lateral inclination corrected second image with the midline centered in said lateral inclination corrected image.

31. (Original) The method of Claim 30, further comprising:

obtaining a temporally separated digital third image of the chest of the same subject;

detecting ribcage edges on both sides of the lungs in said third image;

determining average horizontal locations of the left and right ribcage edges at plural vertical locations in said third image;

fitting the determined average horizontal locations to a straight line to derive a midline in said third image;

rotating the third image so that the mid line detected in said third image is vertical;

shifting the rotated image to produce a lateral inclination corrected fourth image with the midline centered in said fourth image; and

performing image warping on one of the second and fourth images to produce a warped image which is registered to the other of said second and fourth images; and

subtracting the warped image from the other image to generate a subtraction image.

32. (Original) The method of Claim 31, comprising:

displaying at least one of the first through fourth and subtraction images.

33. (Original) The method of Claim 30, wherein said step of performing image warping comprises:

performing global matching to align the lung areas of the one image to the other image;

performing local matching of selected regions of interest in the right and left lungs of said one image to the right and left lungs of the other image to generate shift values for pixels of said one image;

performing surface fitting on the shift values of the right lung of the one image and independently performing surface fitting of shift values of the left lung of the one image to

smooth the shift values and generate fitted shift values for the left and right lungs of the one

image;

shifting pixels of the one image using the fitted shift values.

34. (Original) The method of Claim 31, further comprising:

producing an enhanced subtraction image, including: enhancing contrast of the lung

regions of the subtraction image;

adding a predetermined pixel value to the pixel values of the lung regions of the

subtraction image;

maintaining pixels of regions other than the lung regions of the subtraction image at

one of,

(1) a constant pixel value to generate a uniform background, and

(2) at the values of corresponding pixels in one of the first, second, third and fourth

images; and

displaying the enhanced subtraction image.

35. (Original) The method of Claim 33, further comprising:

producing an enhanced subtraction image, including: enhancing contrast of the lung

regions of the subtraction image;

adding a predetermined pixel value to the pixel values of the lung regions of the

subtraction image;

maintaining pixels of regions other than the lung regions of the subtraction image at

one of,

(1) a constant pixel value to generate a uniform background, and

(2) at the values of corresponding pixels in one of the first, second, third and fourth images; and

displaying the enhanced subtraction image.

36. (Original) The method of Claim 33, wherein the step of performing image warping comprises:

reducing by a predetermined factor the matrix size of the first and second images prior to performing global matching;

scaling fitted shift values by the predetermined factor for application of the scaled fitted shift values to pixels of said one image;

shifting pixels of said one image using the scaled fitted shift values;

displaying the subtraction image.

37. (Original) The method of Claim 35, wherein the step of performing image warping comprises:

reducing by a predetermined factor the matrix size of the first and second images prior to performing global matching;

scaling fitted shift values by the predetermined factor for application of the scaled fitted shift values to pixels of said one image;

shifting pixels of said one image using the scaled fitted shift values; displaying the subtraction image.

38. (Original) The method of Claim 31, further comprising:

locating locations of candidate abnormalities in the subtraction image;

extracting at least one predetermined feature from each candidate abnormality;

comparing each extracted feature with a predetermined threshold; and

removing from consideration false positive locations having an extracted feature which bears a predetermined relationship with respect to said predetermined threshold.

39. (Original) The method of Claim 38, wherein said extracting step comprises:

extracting at least one of contrast, standard deviation, and correlation between contrast and standard deviation at the locations of the candidate abnormalities in the subtraction image.

40. (Original) The method of Claim 39, wherein contrast and standard deviation are extracted.

41. (Original) The method of Claim 39, wherein contrast and correlation are extracted.

42. (Original) The method of Claim 39, wherein standard deviation and correlation are extracted.

43. (Original) The method of Claim 40, wherein correlation is extracted.

44. (Original) The method of Claim 43, comprising:

displaying at least one of said first, second, third, fourth and subtraction images with locations of candidate abnormalities under consideration identified in the displayed image.

45. (Original) The method of Claim 33, further comprising:

locating locations of candidate abnormalities in the subtraction image;

extracting at least one predetermined feature from each candidate abnormality;

comparing each extracted feature with a predetermined threshold; and

removing from consideration false positive locations having an extracted feature

which bears a predetermined relationship with respect to said predetermined threshold.

46. (Original) The method of Claim 45, wherein said extracting step comprises:

extracting at least one of contrast, standard deviation, and correlation between

contrast and standard deviation at the locations of the candidate abnormalities in the

subtraction image.

47. (Original) The method of Claim 46, wherein contrast and standard deviation are

extracted.

48. (Original) The method of Claim 46, wherein contrast and correlation are

extracted.

49. (Original) The method of Claim 46, wherein standard deviation and correlation

are extracted.

50. (Original) The method of Claim 47, wherein correlation is extracted.

51. (Original) The method of Claim 50, comprising:

displaying at least one of said first, second and subtraction images with locations of

candidate abnormalities under consideration identified in the displayed image.

52. (Original) The method of Claim 38, further comprising:

locating locations of candidate abnormalities in the subtraction image;

extracting at least one predetermined feature from each candidate abnormality;

comparing each extracted feature with a predetermined threshold; and

removing from consideration false positive locations having an extracted feature

which bears a predetermined relationship with respect to said predetermined threshold.

53. (Original) The method of Claim 52, wherein said extracting step comprises:

extracting at least one of contrast, standard deviation, and correlation between

contrast and standard deviation at the locations of the candidate abnormalities in the

subtraction image.

54. (Original) The method of Claim 53, wherein contrast and standard deviation are

extracted.

55. (Original) The method of Claim 53, wherein contrast and correlation are

extracted.

56. (Original) The method of Claim 53, wherein standard deviation and correlation

are extracted.

57. (Original) The method of Claim 54, wherein correlation is extracted.

58. (Currently Amended) The method of Claim [[58]] 57, comprising:

displaying at least one of said first, second, third, fourth and subtraction images with locations of candidate abnormalities under consideration identified in the displayed image.

59. (Currently Amended) An image processing system ~~configured to perform the steps recited in one of claims 1-58~~, comprising:

a mechanism configured to obtain a digital first image of a chest;

a mechanism configured to produce a second image which is a mirror image of the first image;

a mechanism configured to perform image warping on one of the first and second images to produce a warped image which is registered to the other of said first and second images; and

a mechanism configured to subtract the warped image from the other image to generate a subtraction image.

60. (Currently Amended) A storage medium storing a program for performing the steps of ~~recited in one of claims 1-58~~:

obtaining a digital first image of a chest;

producing a second image which is a mirror image of the first image;

performing image warping on one of the first and second images to produce a warped image which is registered to the other of said first and second images; and

subtracting the warped image from the other image to generate a subtraction image.

61. (New) The system of Claim 59, further comprising:

a mechanism configured to display the subtraction image.

62. (New) The system of Claim 59, wherein said mechanism configured to obtain a digital first image comprises:

a mechanism configured to obtain a digital original image; and

a mechanism configured to perform lateral inclination correction on the original image to generate said first image, comprising,

a mechanism configured to detect ribcage edges on both sides of the lungs in the original image,

a mechanism configured to determine average horizontal locations of the left and right ribcage edges at plural vertical locations,

a mechanism configured to fit the determined average horizontal locations to a straight line to derive a midline, rotating the original image so that the midline is vertical, and

a mechanism configured to shift the rotated image to produce said first image with the midline centered in said first image.

63. (New) The system of Claim 61, wherein said mechanism configured to perform image warping comprises:

a mechanism configured to perform global matching to align the lung areas of the one image to the other image;

a mechanism configured to perform local matching of selected regions of interest in the right and left lungs of said one image to the right and left lungs of the other image to generate shift values for pixels of said one image;

a mechanism configured to perform surface fitting on the shift values of the right lung of the one image and independently performing surface fitting of shift values of the left lung of the one image to smooth the shift values and generate fitted shift values for the left and right lungs of the one image;

a mechanism configured to shift pixels of the one image using the fitted shift values.

64. (New) The system of Claim 59, further comprising: a mechanism configured to produce an enhanced subtraction image, including:

a mechanism configured to enhance contrast of the lung regions of the subtraction image;

a mechanism configured to add a predetermined pixel value to the pixel values of the lung regions of the subtraction image;

a mechanism configured to maintain pixels of regions other than the lung regions of the subtraction image at one of,

(1) a constant pixel value to generate a uniform background, and

(2) at the values of corresponding pixels in one of the first and second images; and

a mechanism configured to display the enhanced subtraction image.

65. (New) The system of Claim 62, further comprising: a mechanism configured to produce an enhanced subtraction image, including:

a mechanism configured to enhance contrast of the lung regions of the subtraction image;

a mechanism configured to add a predetermined pixel value to the pixel values of the lung regions of the subtraction image;

a mechanism configured to maintain pixels of regions other than the lung regions of the subtraction image at one of,

(1) a constant pixel value to generate a uniform background, and

(2) at the values of corresponding pixels in one of the first and second images; and

a mechanism configured to display the enhanced subtraction image.

66. (New) The system of Claim 62, wherein the mechanism configured to perform image warping comprises:

a mechanism configured to reduce by a predetermined factor the matrix size of the first and second images prior to performing global matching;

a mechanism configured to scale fitted shift values by the predetermined factor for application of the scaled fitted shift values to pixels of said one image;

a mechanism configured to shift pixels of said one image using the scaled fitted shift values; displaying the subtraction image.

67. (New) The system of Claim 64, wherein the mechanism configured to perform image warping comprises:

a mechanism configured to reduce by a predetermined factor the matrix size of the first and second images prior to performing global matching;

a mechanism configured to scale fitted shift values by the predetermined factor for application of the scaled fitted shift values to pixels of said one image;

a mechanism configured to shift pixels of said one image using the scaled fitted shift values;

a mechanism configured to display the subtraction image.

68. (New) The system of Claim 59, further comprising:

a mechanism configured to locate locations of candidate abnormalities in the subtraction image;

a mechanism configured to extract at least one predetermined feature from each candidate abnormality;

a mechanism configured to compare each extracted feature with a predetermined threshold; and

a mechanism configured to remove from consideration false positive locations having an extracted feature which bears a predetermined relationship with respect to said predetermined threshold.

69. (New) The system of Claim 67, wherein said mechanism configured to extract comprises:

a mechanism configured to extract at least one of contrast, standard deviation, and correlation between contrast and standard deviation at the locations of the candidate abnormalities in the subtraction image.

70. (New) The system of Claim 68, wherein the mechanism configured to extract is configured to extract contrast and standard deviation.

71. (New) The system of Claim 68, wherein the mechanism configured to extract is configured to extract contrast and correlation.

72. (New) The system of Claim 68, wherein the mechanism configured to extract is configured to extract standard deviation and correlation.

73. (New) The system of Claim 69, wherein the mechanism configured to extract is configured to extract correlation.

74. (New) The system of Claim 72, comprising:

a mechanism configured to display at least one of said first, second and subtraction images with locations of candidate abnormalities under consideration identified in the displayed image.

75. (New) The system of Claim 61, further comprising:

a mechanism configured to locate locations of candidate abnormalities in the subtraction image;

a mechanism configured to extract at least one predetermined feature from each candidate abnormality;

a mechanism configured to compare each extracted feature with a predetermined threshold; and

a mechanism configured to remove from consideration false positive locations having an extracted feature which bears a predetermined relationship with respect to said predetermined threshold.

76. (New) The system of Claim 74, wherein said mechanism configured to extract comprises:

a mechanism configured to extract at least one of contrast, standard deviation, and correlation between contrast and standard deviation at the locations of the candidate abnormalities in the subtraction image.

77. (New) The system of Claim 75, wherein the mechanism configured to extract is configured to extract contrast and standard deviation.

78. (New) The system of Claim 75, wherein the mechanism configured to extract is configured to extract contrast and correlation.

79. (New) The system of Claim 75, wherein the mechanism configured to extract is configured to extract standard deviation and correlation.

80. (New) The system of Claim 76, wherein the mechanism configured to extract is configured to extract correlation.

81. (New) The system of Claim 79, comprising:

a mechanism configured to display at least one of said original, first, second and subtraction images with locations of candidate abnormalities under consideration identified in the displayed image.

82. (New) The system of Claim 64, further comprising:

a mechanism configured to locate locations of candidate abnormalities in the subtraction image;

a mechanism configured to extract at least one predetermined feature from each candidate abnormality;

a mechanism configured to compare each extracted feature with a predetermined threshold; and

a mechanism configured to remove from consideration false positive locations having an extracted feature which bears a predetermined relationship with respect to said predetermined threshold.

83. (New) The system of Claim 81, wherein said mechanism configured to extract comprises:

a mechanism configured to extract at least one of contrast, standard deviation, and correlation between contrast and standard deviation at the locations of the candidate abnormalities in the subtraction image.

84. (New) The system of Claim 82, wherein the mechanism configured to extract is configured to extract contrast and standard deviation.

85. (New) The system of Claim 82, wherein the mechanism configured to extract is configured to extract contrast and correlation.

86. (New) The system of Claim 82, wherein the mechanism configured to extract is configured to extract standard deviation and correlation.

87. (New) The system of Claim 83, wherein the mechanism configured to extract is configured to extract correlation.

88. (New) The system of Claim 86, comprising:

a mechanism configured to display at least one of said original, first, second and subtraction images with locations of candidate abnormalities under consideration identified in the displayed image.

89. (New) An image processing system, comprising:

a mechanism configured to obtain a digital first image of a chest of a subject;

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a mechanism configured to detect ribcage edges on both sides of the lungs in said first chest image;

a mechanism configured to determine average horizontal locations of the left and right ribcage edges at plural vertical locations;

a mechanism configured to fit the determined average horizontal locations to a straight line to derive a midline;

a mechanism configured to rotate the chest image so that the midline is vertical; and

a mechanism configured to shift the rotated image to produce a lateral inclination corrected second image with the midline centered in said lateral inclination corrected image.

90. (New) The system of Claim 89, further comprising:

a mechanism configured to obtain a temporally separated digital third image of the chest of the same subject;

a mechanism configured to detect ribcage edges on both sides of the lungs in said third image;

a mechanism configured to determine average horizontal locations of the left and right ribcage edges at plural vertical locations in said third image;

a mechanism configured to fit the determined average horizontal locations to a straight line to derive a midline in said third image;

a mechanism configured to rotate the third image so that the mid line detected in said third image is vertical;

a mechanism configured to shift the rotated image to produce a lateral inclination corrected fourth image with the midline centered in said fourth image; and

a mechanism configured to perform image warping on one of the second and fourth

images to produce a warped image which is registered to the other of said second and fourth

images; and

a mechanism configured to subtract the warped image from the other image to

generate a subtraction image.

91. (New) The system of Claim 90, comprising:

a mechanism configured to display at least one of the first through fourth and

subtraction images.

92. (New) The system of Claim 89, wherein said mechanism configured to perform

image warping comprises:

a mechanism configured to perform global matching to align the lung areas of the one

image to the other image;

a mechanism configured to perform local matching of selected regions of interest in

the right and left lungs of said one image to the right and left lungs of the other image to

generate shift values for pixels of said one image;

a mechanism configured to perform surface fitting on the shift values of the right lung

of the one image and independently performing surface fitting of shift values of the left lung

of the one image to smooth the shift values and generate fitted shift values for the left and

right lungs of the one image;

a mechanism configured to shift pixels of the one image using the fitted shift values.

93. (New) The system of Claim 90, further comprising:

a mechanism configured to produce an enhanced subtraction image, including:

enhancing contrast of the lung regions of the subtraction image;

a mechanism configured to add a predetermined pixel value to the pixel values of the

lung regions of the subtraction image;

a mechanism configured to maintain pixels of regions other than the lung regions of

the subtraction image at one of,

(1) a constant pixel value to generate a uniform background, and

(2) at the values of corresponding pixels in one of the first, second, third and fourth

images; and

a mechanism configured to display the enhanced subtraction image.

94. (New) The system of Claim 92, further comprising:

a mechanism configured to produce an enhanced subtraction image, including: a

mechanism configured to enhance contrast of the lung regions of the subtraction image;

a mechanism configured to add a predetermined pixel value to the pixel values of the

lung regions of the subtraction image;

a mechanism configured to maintain pixels of regions other than the lung regions of

the subtraction image at one of,

(1) a constant pixel value to generate a uniform background, and

(2) at the values of corresponding pixels in one of the first, second, third and fourth

images; and

a mechanism configured to display the enhanced subtraction image.

95. (New) The system of Claim 92, wherein the mechanism configured to perform

image warping comprises:

a mechanism configured to reduce by a predetermined factor the matrix size of the first and second images prior to performing global matching;

a mechanism configured to scale fitted shift values by the predetermined factor for application of the scaled fitted shift values to pixels of said one image;

a mechanism configured to shift pixels of said one image using the scaled fitted shift values;

a mechanism configured to display the subtraction image.

96. (New) The system of Claim 94, wherein the mechanism configured to perform image warping comprises:

a mechanism configured to reduce by a predetermined factor the matrix size of the first and second images prior to performing global matching;

a mechanism configured to scale fitted shift values by the predetermined factor for application of the scaled fitted shift values to pixels of said one image;

a mechanism configured to shift pixels of said one image using the scaled fitted shift values; and

a mechanism configured to display the subtraction image.

97. (New) The system of Claim 90, further comprising:

a mechanism configured to locate locations of candidate abnormalities in the subtraction image;

a mechanism configured to extract at least one predetermined feature from each candidate abnormality;

a mechanism configured to compare each extracted feature with a predetermined threshold; and

a mechanism configured to remove from consideration false positive locations having an extracted feature which bears a predetermined relationship with respect to said predetermined threshold.

98. (New) The system of Claim 97, wherein said mechanism configured to extract comprises:

a mechanism configured to extract at least one of contrast, standard deviation, and correlation between contrast and standard deviation at the locations of the candidate abnormalities in the subtraction image.

99. (New) The system of Claim 98, wherein the mechanism configured to extract is configured to extract contrast and standard deviation.

100. (New) The system of Claim 98, wherein the mechanism configured to extract is configured to extract contrast and correlation.

101. (New) The system of Claim 98, wherein the mechanism configured to extract is configured to extract standard deviation and correlation.

102. (New) The system of Claim 99, wherein the mechanism configured to extract is configured to extract correlation.

103. (New) The system of Claim 102, comprising:

a mechanism configured to display at least one of said first, second, third, fourth and subtraction images with locations of candidate abnormalities under consideration identified in the displayed image.

104. (New) The system of Claim 92, further comprising:

a mechanism configured to locate locations of candidate abnormalities in the subtraction image;

a mechanism configured to extract at least one predetermined feature from each candidate abnormality;

a mechanism configured to compare each extracted feature with a predetermined threshold; and

a mechanism configured to remove from consideration false positive locations having an extracted feature which bears a predetermined relationship with respect to said predetermined threshold.

105. (New) The system of Claim 104, wherein said mechanism configured to extract comprises:

a mechanism configured to extract at least one of contrast, standard deviation, and correlation between contrast and standard deviation at the locations of the candidate abnormalities in the subtraction image.

106. (New) The system of Claim 105, wherein the mechanism configured to extract is configured to extract contrast and standard deviation.

107. (New) The system of Claim 105, wherein the mechanism configured to extract is configured to extract contrast and correlation.

108. (New) The system of Claim 105, wherein the mechanism configured to extract is configured to extract standard deviation and correlation.

109. (New) The system of Claim 106, wherein the mechanism configured to extract is configured to extract correlation.

110. (New) The system of Claim 109, comprising:

a mechanism configured to display at least one of said first, second and subtraction images with locations of candidate abnormalities under consideration identified in the displayed image.

111. (New) The system of Claim 97, further comprising:

a mechanism configured to locate locations of candidate abnormalities in the subtraction image;

a mechanism configured to extract at least one predetermined feature from each candidate abnormality; comparing each extracted feature with a predetermined threshold; and

a mechanism configured to remove from consideration false positive locations having an extracted feature which bears a predetermined relationship with respect to said predetermined threshold.

112. (New) The system of Claim 111, wherein said mechanism configured to extract comprises:

a mechanism configured to extract at least one of contrast, standard deviation, and correlation between contrast and standard deviation at the locations of the candidate abnormalities in the subtraction image.

113. (New) The system of Claim 112, wherein the mechanism configured to extract is configured to extract contrast and standard deviation.

114. (New) The system of Claim 112, wherein the mechanism configured to extract is configured to extract contrast and correlation.

115. (New) The system of Claim 112, wherein the mechanism configured to extract is configured to extract standard deviation and correlation.

116. (New) The system of Claim 113, wherein the mechanism configured to extract is configured to extract correlation.

117. (New) The system of Claim 116, comprising:

a mechanism configured to display at least one of said first, second, third, fourth and subtraction images with locations of candidate abnormalities under consideration identified in the displayed image.

118. (New) The storage medium of Claim 60, further comprising:

displaying the subtraction image.

119. (New) The storage medium of Claim 60, wherein said step of obtaining a digital first image comprises:

obtaining a digital original image; and

performing lateral inclination correction on the original image to generate said first image, comprising,

detecting ribcage edges on both sides of the lungs in the original image,

determining average horizontal locations of the left and right ribcage edges at plural vertical locations,

fitting the determined average horizontal locations to a straight line to derive a midline, rotating the original image so that the midline is vertical, and

shifting the rotated image to produce said first image with the midline centered in said first image.

120. (New) The storage medium of Claim 119, wherein said step of performing image warping comprises:

performing global matching to align the lung areas of the one image to the other image;

performing local matching of selected regions of interest in the right and left lungs of said one image to the right and left lungs of the other image to generate shift values for pixels of said one image;

performing surface fitting on the shift values of the right lung of the one image and independently performing surface fitting of shift values of the left lung of the one image to smooth the shift values and generate fitted shift values for the left and right lungs of the one image;

shifting pixels of the one image using the fitted shift values.

121. (New) The storage medium of Claim 60, further comprising:

producing an enhanced subtraction image, including: enhancing contrast of the lung regions of the subtraction image;

adding a predetermined pixel value to the pixel values of the lung regions of the subtraction image;

maintaining pixels of regions other than the lung regions of the subtraction image at one of,

(1) a constant pixel value to generate a uniform background, and

(2) at the values of corresponding pixels in one of the first and second images; and

displaying the enhanced subtraction image.

122. (New) The storage medium of Claim 120, further comprising: producing an enhanced subtraction image, including:

enhancing contrast of the lung regions of the subtraction image;

adding a predetermined pixel value to the pixel values of the lung regions of the subtraction image;

maintaining pixels of regions other than the lung regions of the subtraction image at one of,

(1) a constant pixel value to generate a uniform background, and

(2) at the values of corresponding pixels in one of the first and second images; and

displaying the enhanced subtraction image.

123. (New) The storage medium of Claim 120, wherein the step of performing image warping comprises:

reducing by a predetermined factor the matrix size of the first and second images prior to performing global matching;

scaling fitted shift values by the predetermined factor for application of the scaled fitted shift values to pixels of said one image;

shifting pixels of said one image using the scaled fitted shift values; displaying the subtraction image.

124. (New) The storage medium of Claim 122, wherein the step of performing image warping comprises:

reducing by a predetermined factor the matrix size of the first and second images prior to performing global matching;

scaling fitted shift values by the predetermined factor for application of the scaled fitted shift values to pixels of said one image;

shifting pixels of said one image using the scaled fitted shift values;

displaying the subtraction image.

125. (New) The storage medium of Claim 60, further comprising:

locating locations of candidate abnormalities in the subtraction image;

extracting at least one predetermined feature from each candidate abnormality;

comparing each extracted feature with a predetermined threshold; and

removing from consideration false positive locations having an extracted feature which bears a predetermined relationship with respect to said predetermined threshold.

126. (New) The storage medium of Claim 125, wherein said extracting step comprises:

extracting at least one of contrast, standard deviation, and correlation between contrast and standard deviation at the locations of the candidate abnormalities in the subtraction image.

127. (New) The storage medium of Claim 126, wherein contrast and standard deviation are extracted.

128. (New) The storage medium of Claim 126, wherein contrast and correlation are extracted.

129. (New) The storage medium of Claim 126, wherein standard deviation and correlation are extracted.

130. (New) The storage medium of Claim 127, wherein correlation is extracted.

131. (New) The storage medium of Claim 130, comprising:

displaying at least one of said first, second and subtraction images with locations of candidate abnormalities under consideration identified in the displayed image.

132. (New) The storage medium of Claim 119, further comprising:

locating locations of candidate abnormalities in the subtraction image;

extracting at least one predetermined feature from each candidate abnormality;

comparing each extracted feature with a predetermined threshold; and

removing from consideration false positive locations having an extracted feature which bears a predetermined relationship with respect to said predetermined threshold.

133. (New) The storage medium of Claim 132, wherein said extracting step comprises:

extracting at least one of contrast, standard deviation, and correlation between contrast and standard deviation at the locations of the candidate abnormalities in the subtraction image.

134. (New) The storage medium of Claim 133, wherein contrast and standard deviation are extracted.

135. (New) The storage medium of Claim 133, wherein contrast and correlation are extracted.

136. (New) The storage medium of Claim 133, wherein standard deviation and correlation are extracted.

137. (New) The storage medium of Claim 134, wherein correlation is extracted.

138. (New) The storage medium of Claim 137, comprising:

displaying at least one of said original, first, second and subtraction images with locations of candidate abnormalities under consideration identified in the displayed image.

139. (New) The storage medium of Claim 122, further comprising:

locating locations of candidate abnormalities in the subtraction image;

extracting at least one predetermined feature from each candidate abnormality;

comparing each extracted feature with a predetermined threshold; and

removing from consideration false positive locations having an extracted feature which bears a predetermined relationship with respect to said predetermined threshold.

140. (New) The storage medium of Claim 139, wherein said extracting step comprises:

extracting at least one of contrast, standard deviation, and correlation between contrast and standard deviation at the locations of the candidate abnormalities in the subtraction image.

141. (New) The storage medium of Claim 140, wherein contrast and standard deviation are extracted.

142. (New) The storage medium of Claim 140, wherein contrast and correlation are extracted.

143. (New) The storage medium of Claim 140, wherein standard deviation and correlation are extracted.

144. (New) The storage medium of Claim 141, wherein correlation is extracted.

145. (New) The storage medium of Claim 144, comprising:

displaying at least one of said original, first, second and subtraction images with locations of candidate abnormalities under consideration identified in the displayed image.

146. (New) A storage medium storing a program for performing the steps of:

obtaining a digital first image of a chest of a subject;

detecting ribcage edges on both sides of the lungs in said first chest image;

determining average horizontal locations of the left and right ribcage edges at plural

vertical locations;

fitting the determined average horizontal locations to a straight line to derive a

midline; rotating the chest image so that the midline is vertical; and

shifting the rotated image to produce a lateral inclination corrected second image with

the midline centered in said lateral inclination corrected image.

147. (New) The storage medium of Claim 146, further comprising:

obtaining a temporally separated digital third image of the chest of the same subject;

detecting ribcage edges on both sides of the lungs in said third image;

determining average horizontal locations of the left and right ribcage edges at plural

vertical locations in said third image;

fitting the determined average horizontal locations to a straight line to derive a

midline in said third image;

rotating the third image so that the mid line detected in said third image is vertical;

shifting the rotated image to produce a lateral inclination corrected fourth image with

the midline centered in said fourth image; and

performing image warping on one of the second and fourth images to produce a

warped image which is registered to the other of said second and fourth images; and

subtracting the warped image from the other image to generate a subtraction image.

148. (New) The storage medium of Claim 147, comprising:

displaying at least one of the first through fourth and subtraction images.

149. (New) The storage medium of Claim 146, wherein said step of performing image warping comprises:

performing global matching to align the lung areas of the one image to the other image;

performing local matching of selected regions of interest in the right and left lungs of said one image to the right and left lungs of the other image to generate shift values for pixels of said one image;

performing surface fitting on the shift values of the right lung of the one image and independently performing surface fitting of shift values of the left lung of the one image to smooth the shift values and generate fitted shift values for the left and right lungs of the one image;

shifting pixels of the one image using the fitted shift values.

150. (New) The storage medium of Claim 147, further comprising:

producing an enhanced subtraction image, including: enhancing contrast of the lung regions of the subtraction image;

adding a predetermined pixel value to the pixel values of the lung regions of the subtraction image;

maintaining pixels of regions other than the lung regions of the subtraction image at one of,

(1) a constant pixel value to generate a uniform background, and

(2) at the values of corresponding pixels in one of the first, second, third and fourth images; and

displaying the enhanced subtraction image.

151. (New) The storage medium of Claim 149, further comprising:

producing an enhanced subtraction image, including: enhancing contrast of the lung

regions of the subtraction image;

adding a predetermined pixel value to the pixel values of the lung regions of the

subtraction image;

maintaining pixels of regions other than the lung regions of the subtraction image at

one of,

(1) a constant pixel value to generate a uniform background, and

(2) at the values of corresponding pixels in one of the first, second, third and fourth

images; and

displaying the enhanced subtraction image.

152. (New) The storage medium of Claim 149, wherein the step of performing image

warping comprises:

reducing by a predetermined factor the matrix size of the first and second images prior

to performing global matching;

scaling fitted shift values by the predetermined factor for application of the scaled

fitted shift values to pixels of said one image;

shifting pixels of said one image using the scaled fitted shift values;

displaying the subtraction image.

153. (New) The storage medium of Claim 151, wherein the step of performing image

warping comprises:

reducing by a predetermined factor the matrix size of the first and second images prior to performing global matching;

scaling fitted shift values by the predetermined factor for application of the scaled fitted shift values to pixels of said one image;

shifting pixels of said one image using the scaled fitted shift values; displaying the subtraction image.

154. (New) The storage medium of Claim 147, further comprising:

locating locations of candidate abnormalities in the subtraction image;

extracting at least one predetermined feature from each candidate abnormality;

comparing each extracted feature with a predetermined threshold; and

removing from consideration false positive locations having an extracted feature which bears a predetermined relationship with respect to said predetermined threshold.

155. (New) The storage medium of Claim 154, wherein said extracting step comprises:

extracting at least one of contrast, standard deviation, and correlation between contrast and standard deviation at the locations of the candidate abnormalities in the subtraction image.

156. (New) The storage medium of Claim 155, wherein contrast and standard deviation are extracted.

157. (New) The storage medium of Claim 155, wherein contrast and correlation are extracted.

158. (New) The storage medium of Claim 155, wherein standard deviation and correlation are extracted.

159. (New) The storage medium of Claim 156, wherein correlation is extracted.

160. (New) The storage medium of Claim 159, comprising:

displaying at least one of said first, second, third, fourth and subtraction images with locations of candidate abnormalities under consideration identified in the displayed image.

161. (New) The storage medium of Claim 149, further comprising:

locating locations of candidate abnormalities in the subtraction image;

extracting at least one predetermined feature from each candidate abnormality;

comparing each extracted feature with a predetermined threshold; and

removing from consideration false positive locations having an extracted feature which bears a predetermined relationship with respect to said predetermined threshold.

162. (New) The storage medium of Claim 161, wherein said extracting step comprises:

extracting at least one of contrast, standard deviation, and correlation between contrast and standard deviation at the locations of the candidate abnormalities in the subtraction image.

163. (New) The storage medium of Claim 162, wherein contrast and standard deviation are extracted.

164. (New) The storage medium of Claim 162, wherein contrast and correlation are extracted.

165. (New) The storage medium of Claim 162, wherein standard deviation and correlation are extracted.

166. (New) The storage medium of Claim 163, wherein correlation is extracted.

167. (New) The storage medium of Claim 166, comprising:

displaying at least one of said first, second and subtraction images with locations of candidate abnormalities under consideration identified in the displayed image.

168. (New) The storage medium of Claim 154, further comprising:

locating locations of candidate abnormalities in the subtraction image;

extracting at least one predetermined feature from each candidate abnormality;

comparing each extracted feature with a predetermined threshold; and

removing from consideration false positive locations having an extracted feature which bears a predetermined relationship with respect to said predetermined threshold.

169. (New) The storage medium of Claim 168, wherein said extracting step comprises:

extracting at least one of contrast, standard deviation, and correlation between contrast and standard deviation at the locations of the candidate abnormalities in the subtraction image.

170. (New) The storage medium of Claim 169, wherein contrast and standard deviation are extracted.

171. (New) The storage medium of Claim 169, wherein contrast and correlation are extracted.

172. (New) The storage medium of Claim 169, wherein standard deviation and correlation are extracted.

173. (New) The storage medium of Claim 170, wherein correlation is extracted.

174. (New) The storage medium of Claim 173, comprising:

displaying at least one of said first, second, third, fourth and subtraction images with locations of candidate abnormalities under consideration identified in the displayed image.